

WHAT IS CLAIMED IS:

1. A scanning exposure apparatus,
comprising:

an illumination optical system for
5 defining an illumination region, having a slit-like
section, on an original with use of laser light; and
driving means for relatively scanningly
moving an original and a substrate relative to the
illumination region;

10 wherein said illumination optical system
includes a scanning optical system for scanning a pupil
plane of said illumination system with the laser light
to produce a secondary light source thereon, such that
the illumination region is defined by light from the
15 secondary light source; and

wherein, when the width of the
illumination region is W (mm), the scan speed of the
original and/or the substrate is V (mm/sec), and the
time necessary for defining the secondary light source
20 once is T (sec), a relation $W/V = nT$ is satisfied, where
 n is an integer.

2. An apparatus according to Claim 1, further
comprising an excimer laser for supplying the laser
25 light, and a projection optical system for projecting
a pattern of the original onto the substrate.

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3. An apparatus according to Claim 2, further comprising wavelength maintaining means for maintaining the wavelength of laser light from said excimer laser constant, wherein said excimer laser is a continuous emission type excimer laser, and wherein said projection optical system is provided by a lens system being made of a substantially single glass material.

10 4. An apparatus according to Claim 3, wherein said wavelength maintaining means includes detecting means for detecting the wavelength of laser light from said excimer laser, and resonator length changing means for changing the resonator length of said excimer laser in accordance with an output of said detecting means.

15 5. An apparatus according to Claim 2, wherein said apparatus is adapted for formation of an image of a linewidth 0.13 micron, and wherein a half bandwidth of a wavelength spectrum of the laser light is not greater than 0.1 pm.

20 6. An apparatus according to Claim 2, wherein said apparatus is adapted for formation of an image of a linewidth 0.09 micron, and wherein a half bandwidth of a wavelength spectrum of the laser light

is not greater than 0.08 pm.

7. An apparatus according to Claim 3, wherein
said excimer laser is an ArF excimer laser, and wherein
5 the glass material is SiO₂.

8. An apparatus according to Claim 3, wherein
said excimer laser is an F₂ excimer laser, and wherein
the glass material is CaF₂, BaF₂ or MgF₂.

9. An apparatus according to Claim 7, wherein
said lens system includes lens elements of a number
of at least ten, and wherein first one or first two
of said lens elements in an order from the substrate
15 side are made of CaF₂, BaF₂ or MgF₂.

10. A device manufacturing method, comprising
the steps of:

exposing a substrate with a pattern by use
20 of a scanning exposure apparatus as recited in Claim
1; and

developing the exposed substrate.

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